REMARKS

In the patent application, claims 1-26 are pending. Claims 10, 15 and 23 are allowed and claims 1-9, 11-14, 16-22 and 24-26 are rejected.

Applicant has amended claims 1, 17 and 24 to include the limitation that the first amount of light is emitted by the first light emitter and reflected by the object, and the second amount of light is emitted by the second light emitter and reflected by the object, and that the change in the first amount of light and the change in the second amount of light are compared in order to determine the location of the object in the designated interaction area. The support for the amendment can be found in Figures 1 and 2a, and lines 13-26. No new matter has been introduced.

At section 3 of the Office Action, the Examiner rejects claims 24-26 under 35 U.S.C. 102(a) as being anticipated by *Fitzgibbon* (U.S. Patent No. 4,710,759). The Examiner states that *Fitzgibbon* discloses a system as claimed.

It is respectfully submitted that *Fitzgibbon* determines which two of the energy paths are blocked by an object touching the screen by measuring the energy as received by the horizontal and vertical detectors. *Fitzgibbon* does not measure the change in the amount of light reflected by the object as claimed in claim 24. Thus, claim 24 is clearly distinguished over the cited *Fitzgibbon* reference.

As for claims 25 and 26, they are dependent from claim 24 and recite features not recited in claim 24. For reasons regarding claim 24 above, it is respectfully submitted that claims 25 and 26 are also distinguished over the cited *Fitzgibbon* reference.

At section 4 of the Office Action, the Examiner rejects claims 1-3, 5 and 17 under 35 U.S.C. 102(b) as being anticipated by *Kuth et al.* (U.S. Patent No. 5,726,685, hereafter referred to as *Kuth*). The Examiner states that *Kuth* discloses a method and device for sensing and detecting the presence of an object by using a light sensor (4) to detect the reflected light from the object.

It is respectfully submitted that *Kuth* discloses a method of determining the position of an input element 2 by using a camera 4 to view the input element, wherein a sharpness plane is set in front of the glass plate 1 so that the input element is considered as being in "optical contact" with the plate 1 when the input element is located at a distance less than an upper range of 3mm through 5mm in front of the plate 1 (col.3, lines 10 - 21). In that context, the camera is used to acquire an image of the input element for determining the lateral position of the input element in the "optical contact" plane in order to simulate the movement of a computer mouse on a plane. The light source 3 is used only to illuminate the input element so that the camera is able to acquire the image of the input element. Using this position determining method, only one illuminating light source is sufficient. Furthermore, if the input element is self-illuminated, as shown in Figure 4, the image of the input element can be acquired by the camera even without having the light source 3. This is to show that *Kuth* does not disclose or even suggest that the change in the amount of light emitted by one light source and reflected by the input element, and the change in the amount of light emitted by another light source are separately measured and then compared in order to determine the position of the input element relative to the two light sources. Moreover, in order to define the sharpness plane and to form an image on the image plane of the camera, a camera lens is required (see Figures 1, 3 and 4) to focus the image on a plurality of camera elements (col.3, lines 10-12).

In the invention as claimed in claims 1 and 17, a light receiver is used to measure separately the changes in the first amount and second amount of light. In contrast, *Kuth* requires a plurality of camera elements.

For the above reasons, it is respectfully submitted that claims 1 and 17 are clearly distinguishable over the cited *Kuth* reference.

As for claims 2, 3 and 5, they are dependent from claim 1 and recite features not recited in claim 1. For reasons regarding claim 1 above, it is respectfully submitted that claims 2, 3 and 5 are also distinguishable over the cited *Kuth* reference.

At section 5, claims 1-9, 11-14, 16-18, 21 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by *Weissmueller et al.* (U.S. Patent No. 4,459,479, hereafter referred to as *Weissmueller*). The Examiner states that *Weissmueller* also discloses that the light receiver is

capable of receiving a first amount of light and a second amount of light via reflection at reflection components 42 and 44. However, *Weissmueller* does not disclose or even suggest that each of the first amount of light and the second amount of light is reflected from the object that the user uses to interact with the touch pad as claimed in claim 1, or that each of the first amount of light and the second amount of light is reflected from the object that causes the changes in the first amount and the second amount when it is present at the touch pad device as claimed in claim 17.

For the above reasons, it is respectfully submitted that claims 1 and 17 are clearly distinguishable over the cited *Weissmueller* reference.

As for claims 2-9, 11-14, 16, 18, 21 and 22, they are dependent from claims 1 and 17 and recite features not recited in claims 1 and 17. For reasons regarding claims 1 and 17 above, it is respectfully submitted that claims 2-9, 11-14, 16, 18, 21 and 22 are also distinguishable over the cited *Weissmueller* reference.

CONCLUSION

Applicant has amended claims 1, 17 and 24 to further distinguish the claimed invention over the cited *Fitzgibbon*, *Kuth* and *Weissmuller* references. As amended, claims 1-9, 11-14, 16-22 and 24-26 are allowable. Early allowance of claims 1-9, 11-14, 16-22 and 24-26 is earnestly solicited.

Respectfully submitted,

Kenneth Q. Lao
Attorney for the Applicant
Registration No. 40,061

WARE, FRESSOLA, VAN DER SLUYS
& ADOLPHSON LLP
Bradford Green, Building Five
755 Main Street, P.O. Box 224
Monroe, CT 06468
Telephone: (203) 261-1234
Facsimile: (203) 261-5676
USPTO Customer No. 004955

Claim Amendments

1. (currently amended) A method of sensing and detecting the presence of an object at a touch pad device having one or more input functions, wherein the touch pad device has a designated interaction area for allowing a user to use the object to interact with the touch pad device for facilitating said one ore more input functions, said method comprising the steps of:

providing at least one group of optical sensor components including a first light emitter, a second light emitter and a light receiver in the touch pad device at different locations thereof such that the receiver is capable of receiving a first amount of light emitted by the first light emitter and reflected by the object and a second amount of light emitted by the second light emitter and reflected by the object; wherein when the object is present at the touch pad device, causing a change in the first amount of light and the second amount of light,

measuring separately the change in the first amount of light and the change in the second amount of light for providing a first signal and a second signal indicative of the respective changes; and

determining the location of the object in the designated interaction area in relation to the first light emitter and the second light emitter by comparing the change in first amount of light and the change in the second amount of light based on the first and second signals.

2. (original) The method of claim 1, wherein said group of optical sensor components is placed within the designated interaction area.

3. (original) The method of claim 2, wherein the designated interaction area has an upper side and a lower side, and said group of optical sensor components is placed on either the upper side or the lower side.

4. (original) The method of claim 2, wherein the designated interaction area has a left side and a right side, and said group of optical sensor components is placed on either the left side or the right side.

5. (original) The method of claim 1, wherein the measuring and determining steps are carried repeatedly for providing changes in the location of the object as a function of time.

6. (original) The method of claim 1, wherein the touch pad device has a peripheral area surrounding the designated interaction area, and said group of optical sensor components are placed within the peripheral area.

7. (original) The method of claim 6, wherein the designated interaction area has an upper side and a lower side, and said group of optical sensor components is placed on either the upper side or the lower side.

8. (original) The method of claim 6, wherein the designated interaction area has a left side and a right side, and said group of optical sensor components is placed on either the left side or the right side.

9. (original) The method of claim 1, wherein the first and second light emitters are operated in a pulsed mode of a predetermined frequency so that the changes in the first amount of light and the second amount of light contain a frequency component of the predetermined frequency.

10. (previously presented) A method of sensing and detecting the presence of an object at a touch pad device having one or more input functions, wherein the touch pad device has a designated interaction area for allowing a user to use the object to interact with the touch pad device for performing said one or more input functions, said method comprising the steps of:

providing at least one group of optical sensor components including a first light emitter, a second light emitter and a light receiver in the touch pad device at different locations thereof such that the receiver is capable of receiving a first amount of light emitted by the first light emitter and a second amount of light emitted by the second light emitter; wherein when the object is present at the touch pad device, causing a change in the first amount of light and the second amount of light,

measuring separately the change in the first amount of light and the change in the second amount of light for providing a first signal and a second signal indicative of the respective changes; and

determining the location of the object in the designated interaction area in relation to the first light emitter and the second light emitter based on the first and second signals, wherein the first and second light emitters are operated in a pulsed mode of a predetermined frequency so that the changes in the first amount of light and the second amount of light contain a frequency component of the predetermined frequency, and wherein the pulsed mode of the first and second light emitters are operated in a pulsed mode of a predetermined frequency with a first phase and said group of optical sensor components further includes a third light emitter positioned adjacent to the light emitter to provide a third amount of light to the light receiver, and wherein the third light emitter is operated in said pulsed mode with a second phase complementary of the first phase and the third light emitter is controlled such that the third amount of light is substantially equal to a sum of the first amount and the second amount when the object is not present at the touch pad device so as to reduce a frequency component in the sum of the first, second and third amounts.

11. (original) The method of claim 1, wherein the touch pad device further includes a further group of optical sensor components including a third light emitter, a fourth light emitter and a further light receiver in the touch pad device at different locations thereof separating said first and second light emitters and the light receiver such that the further receiver is capable of receiving a third amount of light emitted by the third light emitter and a fourth amount of light emitted by the fourth light emitter; wherein when the object is present at the touch pad device, causing a change in the third amount of light and the fourth amount of light said method further comprising the steps of:

measuring separately the change in the third amount of light and the change in the fourth amount of light for providing a third signal and a fourth signal indicative of the respective changes; and

determining the location of the object in the designated interaction area in relation to the third light emitter and the fourth light emitter based on the third and fourth signals.

12. (original) The method of claim 11, wherein the designated interaction area has an upper side and a lower side, and wherein said group of optical sensor components is placed at the upper side and said further group of optical sensor components is placed at the lower side.

13. (original) The method of claim 11, wherein the designated interaction area has a left side and a right side, and wherein said group of optical sensor components is placed at the left side and said further group of optical sensor components is placed at the right side.

14. (original) The method of claim 11, wherein the first, second, third and fourth light emitters are operated in a pulsed mode of a predetermined frequency so that the changes in the first amount, the second amount, the third amount and the fourth amount of light contain a frequency component of the predetermined frequency.

15. (previously presented) A method of sensing and detecting the presence of an object at a touch pad device having one or more input functions, wherein the touch pad device has a designated interaction area for allowing a user to use the object to interact with the touch pad device for performing said one or more input functions, said method comprising the steps of:

providing at least one group of optical sensor components including a first light emitter, a second light emitter and a light receiver in the touch pad device at different locations thereof such that the receiver is capable of receiving a first amount of light emitted by the first light emitter and a second amount of light emitted by the second light emitter; wherein when the object is present at the touch pad device, causing a change in the first amount of light and the second amount of light,

measuring separately the change in the first amount of light and the change in the second amount of light for providing a first signal and a second signal indicative of the respective changes; and

determining the location of the object in the designated interaction area in relation to the first light emitter and the second light emitter based on the first and second signals, wherein the touch pad device further includes a further group of optical sensor components including a third light emitter, a fourth light emitter and a further light receiver in the touch pad device at different locations thereof separating said first and second light emitters and the light receiver such that

the further receiver is capable of receiving a third amount of light emitted by the third light emitter and a fourth amount of light emitted by the fourth light emitter; wherein when the object is present at the touch pad device, causing a change in the third amount of light and the fourth amount of light said method further comprising the steps of:

measuring separately the change in the third amount of light and the change in the fourth amount of light for providing a third signal and a fourth signal indicative of the respective changes; and

determining the location of the object in the designated interaction area in relation to the third light emitter and the fourth light emitter based on the third and fourth signals, wherein the first, second, third and fourth light emitters are operated in a pulsed mode of a predetermined frequency so that the changes in the first amount, the second amount, the third amount and the fourth amount of light contain a frequency component of the predetermined frequency, and wherein the pulsed mode of the first, the second, the third and the fourth light emitters has a first phase, and wherein said group of optical sensor components further includes a first compensation light emitter positioned adjacent to the light receiver to provide a first compensation amount of light to the light receiver, and said further group of optical sensor components further includes a second compensation light emitter positioned adjacent to the further light receiver to provide a second compensation amount to the further light receiver, and the first and second compensation light emitters are operated in a further pulsed mode of the predetermined frequency having a second phase complementary of the first phase and the first and the second compensation light emitters are controlled such that the first compensation amount of light is substantially equal to a sum of the first amount and the second amount, and the second compensation amount of light is substantially equal to a sum of the third amount and the fourth amount when the object is not present at the touch pad device.

16. (original) The method of claim 11, wherein the measuring steps regarding the first amount, second amount, third amount and fourth amount of light and the determining steps based on the first signal, the second signal, the third signal and the fourth signal are carried out repeatedly for providing changes in the location of the object as a function of time.

17. (currently amended) A touch pad device to be used in conjunction with a measurement device, the touch pad device having a designated interaction area for sensing and detecting the presence of an object at the designated interaction area, said touch pad device comprising:

a light receiver provided in or near the designated interaction area, and

a first light emitter and a second light emitter provided respectively at a first location and a second different location in the designated interaction area such that the light receiver is capable of receiving a first amount of light emitted by the first light emitter and reflected by the object, and a second amount of light emitted by the second light emitter and reflected by the object, wherein when the object is present at the touch pad device, it causes a change in the first amount of light and the second amount of light, and wherein the change in the first amount of light and the change in the second amount of light ~~being~~ are separately measured and these measured changes are compared for determining the location of the object in the designated interaction area in relation to the first light emitter and the second light emitter.

18. (original) The touch pad device of claim 17, wherein the first and second light emitters are operated in a pulsed mode of a predetermined frequency so that the changes in the first amount of light and the second amount of light contain a frequency component of the predetermined frequency.

19. (original) The touch pad device of claim 17, wherein the light emitters are light-emitting diodes.

20. (original) The touch pad device of claim 17, wherein the light emitters are operated in an infrared frequency range.

21. (original) The touch pad device of claim 17, wherein the designated interaction area has an upper side and a lower side and the first light emitter, the second light emitter and the light receiver are provided at the upper side, said touch pad device further comprising:

a further light receiver provided at the lower side;

a third light emitter provided at a third location adjacent the light receiver; and

a fourth light emitter provided at a fourth location adjacent the light receiver different from the third location such that the further light receiver is capable of receiving a third amount of light emitted by the third light emitter and a fourth amount of light emitted by the fourth light emitter, wherein when the object is present at the touch pad device, causes a change in the third amount of light and the fourth of light, the change in the third amount of light and the change in the fourth amount of light being separately measured by the measurement device for further determining the location of the object in the designated interaction area in relation to the third light emitter and the fourth light emitter.

22. (original) The touch pad device of claim 17, wherein the designated interaction area has a left side and a right side and the first light emitter, the second light emitter and the light receiver are provided at the left side, said touch pad device further comprising:

a further light receiver provided at the right side;

a third light emitter provided at a third location adjacent the light receiver; and

a fourth light emitter provided at a fourth location adjacent the light receiver different from the third location such that the further light receiver is capable of receiving a third amount of light emitted by the third light emitter and a fourth amount of light emitted by the fourth light emitter, wherein when the object is present at the touch pad device, causes a change in the third amount of light and the fourth of light, the change in the third amount of light and the change in the fourth amount of light being separately measured by the measurement device for further determining the location of the object in the designated interaction area in relation to the third light emitter and the fourth light emitter.

23. (previously presented) A touch pad device to be used in conjunction with a measurement device, the touch pad device having a designated interaction area for sensing and detecting the presence of an object at the designated interaction area, said touch pad device comprising:

a light receiver provided in or near the designated interaction area, and

a first light emitter and a second light emitter provided respectively at a first location and a second different location in the designated interaction area such that the light receiver is capable of receiving a first amount of light emitted by the first light emitter and a second amount of light emitted by the second light emitter, wherein when the object is present at the touch pad device,

causes a change in the first amount of light and the second amount of light, the change in the first amount of light and the change in the second amount of light being separately measured for determining the location of the object in the designated interaction area in relation to the first light emitter and the second light emitter, and wherein the designated interaction area has an upper right corner, an upper left corner, a lower right corner and a lower left corner, and

the first light emitter is provided at the upper right corner;

the second light emitter is provided at the upper left corner; and

the light receiver are positioned between the first and second light emitters, said touch pad device further comprising:

a third light emitter provided at the lower right corner;

a fourth light emitter provided at the lower left corner;

a second light receiver positioned between the third and fourth light emitters, and wherein the second light receiver is capable of receiving a third amount of light emitted by the third light emitter and a fourth amount of light emitted by the fourth light emitter for further determining the location of the object in the designated interaction area in relation to the third light emitter and the fourth light emitter based separately on a change in the third amount and the fourth amount, wherein the first, second, third and fourth light emitters are bi-wavelength emitters emitting light at a first wavelength and a second wavelength, and the light receiver and the second light receiver are receivers operated at the first wavelength;

a third light receiver operated at the second wavelength and positioned between the first and third light emitters, wherein the third light receiver is capable of receiving a fifth amount of light emitted by the first light emitter in the second wavelength and a sixth amount of light emitted by the third light emitter in the second wavelength for further determining the location of the object in the designated interaction area in relation to the first light emitter and the third light emitter based separately on a change in the fifth amount and a change in the sixth amount; and

a fourth light receiver operated at the second wavelength and positioned between the second and fourth light emitters, wherein the fourth light receiver is capable of receiving a seventh amount of light emitted by the second light emitter in the second wavelength and an eighth amount of light emitted by the fourth light emitter in the second wavelength for further determining the location of the object in the designated interaction area in relation to the second

light emitter and the fourth emitter based separately on a change in the seventh amount and a change in the eighth amount.

24. (currently amended) A system for sensing and detecting the presence of an object at a touch pad device, wherein the touch pad device has a designated interaction area for allowing a user to use the object to interact with the touch pad device, said system comprising:

at least one group of optical sensor components including a first light emitter, a second light emitter and a light receiver in the touch pad device at different locations thereof such that the receiver is capable of receiving a first amount of light emitted by the first light emitter and reflected by the object, and a second amount of light emitted by the second light emitter and reflected by the object, wherein the first amount of light and the second amount of light are caused to change when the object is present at the touch pad device;

means, operatively connected to the light receiver, for separately measuring the change in the first amount of light and the change in the second amount of light for providing a first signal and a second signal indicative of the respective changes; and

means, responsive to the first signal and second signal, for comparing the change in the first amount of light and the change in the second amount of light for determining the location of the object in the designated interaction area in relation to the first light emitter and the second light emitter based on the first and second signals.

25. (original) The system of claim 24, wherein the measuring means comprises a timing control module for disabling the first light emitter when the change in the second light amount is measured and disabling the second light emitter when the change in the first light amount is measured.

26. (original) The system of claim 24, wherein the first light emitter and the second light emitter are operated in a pulsed mode of a predetermined frequency so that the changes in the first amount and the second amount contain a frequency component of the predetermined frequency, the measuring means comprising a filtering module for providing the frequency component.